Space Weather Forecast

Issued on Wednesday, 14 December 2022 at 12:10 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate class flares (R1-R2; Minor-Moderate Radio Blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar Activity is now Moderate after two recent low class Moderate-flares. The first at 14/0740 UTC from the most active group currently on the Earth facing disc, which is located in the southwest quadrant. The second was from the large departing region rotating around the west limb at 14/0830 UTC.

There are currently ten sunspot regions on the Earth-facing disc, although most of these are small and simple with little sign of development. The most notable regions are located in the north-centre disc, another in the southeast and a further one in the southwest. The first north-centre region has maintained a relatively simple magnetic structure and shows some recent slight decay. The southeast disc region is also a moderately sized but magnetically relatively simple, but with some further development of the small spots that make up its intermediate and trailing portion. The final region in the southwest, is smaller in areal extent, but is more magnetically complex and has shown further spot growth, also producing a recent Moderate flare mentioned above.

No Earth-directed Coronal Mass Ejections (CMEs) have been observed. However, a filament lift off from the southwest of the Earth facing disc, commencing around 14/0300 UTC is currently being modelled but imagery indicates this is largely directed towards the south, so no significant impacts are anticipated at present. Another CME is emerging off the west limb following the M1 flare from AR3153, but this is directed well off to the west. Analysis will be undertaken once updated imagery allows, but no impacts are expected from this event either.

Solar Wind / Geomagnetic Activity: Solar winds eased gradually from being slightly elevated at around 400km/s to background levels, 340 km/s. The Interplanetary Magnetic field was weak with the north-south component only weakly varying. Consequently geomagnetic activity was Quiet throughout.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has persisted at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be mostly Low, but with a chance of further M-class flares, most likely from the most active region located in the southwest quadrant of the Earth facing disc.

Solar Wind / Geomagnetic Activity: There are currently no Earth-directed CMEs expected. Solar winds are expected to remain at Background to Slightly Elevated with no notable

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enhancements anticipated. Quiet geomagnetic activity expected with only a slight chance of isolated Unsettled intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to persist at background, but due to the number of sunspots on the disc, especially in the west, has a slight chance of rising in response to any notable flares. This gives a very slight chance of approaching, and perhaps exceeding the S1/Minor Storm level.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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